

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

LISTING OF THE CLAIMS:

Claim 1 (Original). A radio reception system capable of receiving signals from a plurality of users using a plurality of antennas, comprising:

signal processing means for performing a prescribed signal processing on the signals received by said plurality of antennas;

a plurality of first signal extracting means for extracting signal components corresponding to said plurality of users, respectively, based on a signal output from said signal processing means;

a plurality of first estimating means for estimating parameter information related to relation between the signal components extracted by said first signal extracting means and the signal output from said signal processing means;

a plurality of first error determining means for determining whether the signal components corresponding to the plurality of users extracted by said first signal extracting means include a demodulation error or not, respectively; and

first operating means for subtracting, from the signal output from said signal processing means, said extracted signal component determined by said first error determining means not to include any demodulation error, in consideration of corresponding said parameter information.

Claim 2 (Original). The radio reception system according to claim 1, further comprising a plurality of second signal extracting means for extracting, based on the signal output from said first operating means, signal components corresponding to users determined by said first error determining means to include a demodulation error, respectively;

a plurality of second estimating means for estimating parameter information related to relation between the signal components extracted by said second signal extracting means and the signal output from said first operating means; and

a plurality of second error determining means for determining whether the signal components extracted by said second signal extracting means include a demodulation error or not, respectively.

Claim 3 (Original): The radio reception system according to claim 2, further comprising second operating means for subtracting, from the signal output from said signal processing means, the signal component extracted by said first and second signal extracting means determined by said first and second error determining means not to include any demodulation error, in consideration of corresponding said parameter information.

Claim 4 (Original): The radio reception system according to claim 2, further comprising third operating means subtracting, from the signal output from said first operating means, the signal component extracted by said second signal extracting means determined by said

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second error determining means not to include any demodulation error, in consideration of corresponding said parameter information.

Claim 5 (Currently Amended): A radio reception system capable of receiving signals from a plurality of users using a plurality of antennas, comprising:

signal processing means for performing a prescribed signal processing on the signals received by said plurality of antennas;

a plurality of first signal extracting means for extracting signal components corresponding to said plurality of users, respectively, based on a signal output from said signal processing means;

a plurality of first estimating means for estimating parameter information related to relation between the signal components extracted by said first signal extracting means and the signal output from said signal processing means based on a correlation value between signal component of the corresponding user and signal component of another user;

a plurality of first error ~~determination~~ determining means for determining whether the signal components corresponding to the plurality of users extracted by said first signal extracting means include a demodulation error or not, respectively; and

first operating means for subtracting, from the signal output from said signal processing means, said extracted signal component determined by said first error determining means not to include any demodulation error, in consideration of corresponding said parameter information.

Claim 6 (Original): The radio reception system according to claim 5, further comprising
a plurality of second signal extracting means for extracting, based on the signal output
from said first operating means, signal components corresponding to users determined by said
first error determining means to include a demodulation error, respectively;

a plurality of second estimating means for estimating parameter information related to
relation between the signal components extracted by said second signal extracting means and the
signal output from said first operating means based on a correlation value between signal
component of the corresponding user and signal component of another user; and

a plurality of second error determining means for determining whether the signal
components extracted by said second signal extracting means include a demodulation error or
not, respectively.

Claim 7 (Original): The radio reception system according to claim 6, further comprising
second operating means for subtracting, from the signal output from said signal
processing means, the signal component extracted by said first and second signal extracting
means determined by said first and second error determining means not to include any
demodulation error, in consideration of corresponding said parameter information.

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Claim 8 (Original): The radio reception system according to claim 6, further comprising
third operating means subtracting, from the signal output from said first operating means,
the signal component extracted by said second signal extracting means determined by said
second error determining means not to include any demodulation error, in consideration of
corresponding said parameter information.

Claim 9 (Original): The radio reception system according to any of claims 5 to 8,
wherein
said plurality of first estimating means estimate said parameter information by calculating
said correlation value, independent from result of determination by said plurality of first error
determination means.

Claim 10 (Original): The radio reception system according to any of claims 5 to 8,
wherein
said plurality of first estimating means estimate said parameter information by calculating
said correlation value using signal components of the users determined not to include any
demodulation error, based on the result of determination by said plurality of first error
determining means.

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Claim 11 (Original): The radio reception system according to any of claims 6 to 8,
wherein

said plurality of second estimating means estimate said parameter information by
calculating said correlation value, independent from result of determination by said plurality of
second error determination means.

Claim 12 (Original): The radio reception system according to any of claims 6 to 8,
wherein

said plurality of second estimating means estimate said parameter information by
calculating said correlation value using signal components of the users determined not to include
any demodulation error, based on the result of determination by said plurality of second error
determining means.

Claim 13 (Currently Amended): A radio reception system capable of receiving signals
from a plurality of users using a plurality of antennas, comprising:

signal processing means for performing a prescribed signal processing on the signals
received by said plurality of antennas; and

~~one~~ a first stage of interference cancellers, including

a plurality of stages of interference removing units corresponding to said plurality of
users; wherein

each stage of said interference removing ~~unit~~ units includes

first signal extracting means for extracting signal component corresponding to a specific user, different stage by stage, among said plurality of users based on an input signal,

first estimating means for estimating parameter information related to relation between the signal component extracted by said first signal extracting means and the signal input to said first signal extracting means,

first operating means for removing the signal component corresponding to said specific user, from the signal input to said first signal extracting means in consideration of said parameter information, and

first error determining means for determining whether the signal component corresponding to said specific user includes a demodulation error or not, and when determined to include the demodulation error, disabling removal of the signal component corresponding to said specific user by said first operating means; and

said plurality of stages of interference removing units are connected such that the signal output from said signal processing means is input to inputs of said first operating means and said first signal extracting means of the first stage of said interference removing units, and an output of said operating means of a former stage interference removing unit of adjacent two interference removing units is applied to inputs of said signal extracting means and said operating means of a latter stage interference removing unit.

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Claim 14 (Currently Amended): The radio reception system according to claim 13,
further comprising

a next stage of interference cancellers receiving an output of said operating means of a
last stage interference removing unit of said ~~one~~ first stage of interference cancellers; wherein

said next stage interference canceller includes a plurality of stages of interference
removing units corresponding to said plurality of users;

each stage of said interference removing units includes

second signal extracting means for extracting and outputting signal component
corresponding to a specific user, different stage by stage, among said plurality of users, based on
an input signal,

second estimating means for estimating parameter information related to relation between
the signal component extracted by said second signal extracting means and the signal input to
said second signal extracting means,

second operating means for removing the signal component corresponding to said
specific user from the signals input to said second signal extracting means, in consideration of
said parameter information, and

second error determining means for determining whether the signal component
corresponding to said specific user includes a demodulation error or not and, when determined to
include an error, disabling removal of the signal component corresponding to said specific user
by said second operating means;

the interference removing unit of said next stage interference canceller corresponding to a user determined not to include any demodulation error by the interference canceller of said first stage provides an output of the interference removing unit of the preceding stage as it is to the interference removing unit of the succeeding stage; and

in the interference removing unit of said next stage interference canceller corresponding to the user determined to include a demodulation error by said first stage interference canceller, an output of the interference removing unit of the preceding stage is applied to inputs of said signal extracting means and said operating means, and an output of said operating means is output to the interference removing unit of the succeeding stage.

Claim 15 (Currently Amended): A radio reception system capable of receiving signals from a plurality of users using a plurality of antennas, comprising:

signal processing means for performing a prescribed signal processing on the signals received by said plurality of antennas; and

~~one~~ a first stage of interference cancellers;

said ~~one~~ first stage of interference canceller includes a plurality of stages of interference removing units corresponding to said plurality of users;

each stage of said interference removing units includes

first signal extracting means for extracting and outputting signal component corresponding to a specific user, different stage by stage, among said plurality of users, based on an input signal,

first estimating means for estimating, based on a correlation value between signal component of said specific user and signal component of another user, parameter information related to relation between the signal component extracted by said first signal extracting means and the signal output from said signal processing means,

first error determining means for determining whether the signal component corresponding to said specific user includes a demodulation error or not, and

first operating means for removing the signal component corresponding to a user determined not to include a demodulation error from the signal output from said signal processing means, in consideration of said parameter information; and

said plurality of stages of interference removing units are connected such that the signal output from said signal processing means is input to inputs of said first operating means and said first signal extracting means of the first stage of said interference removing units, and an output of said operating means of a former interference removing unit of adjacent two interference removing units is applied to an input of said signal extracting means of a latter stage interference removing unit.

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Claim 16 (Currently Amended): The radio reception system according to claim 15,
further comprising

a next stage of interference cancellers receiving an output of said operating means of the
interference removing unit of the last stage of said ~~one~~ first stage of interference cancellers;

wherein

said next stage interference canceller includes a plurality of stages of interference
removing units corresponding to said plurality of users;

each stage of said interference removing unit includes

second signal extracting means for extracting and outputting signal component
corresponding to a specific user, different stage by stage, among said plurality of users based on
an input signal,

second estimating means for estimating, based on a correlation value between signal
component of said specific user and signal component of another user, parameter information
related to relation between the signal component extracted by said second signal extracting
means and the signal output from said signal processing means,

second error determining means for determining whether or not the signal component
corresponding to said specific user includes a demodulation error, and

second operating means for removing the signal component corresponding to the user
determined not to include any demodulation error from the signal output from said signal
processing means, in consideration of said second parameter information;

the interference removing unit of said next stage interference canceller corresponding to the user determined not to include any demodulation error by said first stage interference canceller outputs an output of the interference removing unit of the preceding stage as it is to an interference removing unit of the succeeding stage; and

in the interference removing unit of said next stage interference canceller corresponding to the user determined to include a demodulation error by said first stage interference canceller, an output of the interference removing unit of the preceding stage is applied to an input of said signal extracting means, and an output of said operating means is output to the interference removing unit of the succeeding stage.

Claim 17 (Currently Amended): The radio reception system according to ~~any of claims 13 to 16~~ claim 15, wherein

said first estimating means calculates correlation value between the signal component of said specific user and signal component of another user independent from result of determination by said first error determining means, and estimates said parameter information based on the calculated correlation value.

Claim 18 (Currently Amended): The radio reception system according to ~~any of claims 13 to 16~~ claim 15, wherein

said first estimating means calculates the correlation value using only the signal components of the users determined not to include any demodulation error based on the result of

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determination by said first error determining means, and estimates said parameter information based on the calculated correlation value.

Claim 19 (Original): The radio reception system according to claim 1, 5, 13 or 15,
wherein
said signal extracting means is an adaptive array spatially separating and extracting signal component corresponding to a specific user.

Claim 20 (Original): The radio reception system according to claim 1, 5, 13 or 15,
wherein
said signal extracting means includes
an adaptive array spatially separating and extracting signal component corresponding to a specific user,
a demodulator demodulating an output of said adaptive array, and
a re-modulator re-modulating an output of said demodulator.

Claim 21 (Original): The radio reception system according to claim 1, 5, 13 or 15,
wherein
the signals from said plurality of users are signals transmitted in accordance with PDMA communication method.

Claim 22 (Original): The radio reception system according to claim 1, 5, 13 or 15,
wherein

the signals from said plurality of users are signals transmitted in accordance with CDMA communication method.

Claim 23 (Original): The radio reception system according to claim 22, wherein
the signals transmitted in accordance with said CDMA communication method are spread
by predetermined spreading codes in advance on a transmitting side,

said system further comprising
inverse spreading means for inverse spreading signals output from said signal processing
means by corresponding spreading codes in accordance with CDMA communication method and
applying the results to said signal extracting means.

Claim 24 (New): The radio reception system according to claim 16, wherein
said second estimating means calculates correlation value between the signal
component of said specific user and signal component of another user independent from
result of determination by said second error determining means, and estimates said
parameter information based on the calculated correlation value.

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Claim 25 (New): The radio reception system according to claim 16, wherein
said second estimating means calculates the correlation value using only the signal
component of the users determined not to include any demodulation error based on the result
of determination by said second error determining means, and estimates said parameter
information based on the calculated correlation value.